QUALITY ASSURANCE PROJECT PLAN

For

Prepared by

_____
_____
_____

Prepared for

_____
_____

Date

Note: All blue text is for instructional purposes only. Please delete as you complete your QAPP. Also please check to make sure your Appendices and Tables are numbered, named and referenced correctly.

ACKNOWLEDGEMENTS

This Quality Assurance Project Plan (QAPP) template and guide was developed and written by the Native American Fish and Wildlife Society, Cook Inlet Keeper, and University of Alaska Anchorage- Environment and Natural Resources Institute and has been reviewed and approved by the United States Environmental Protection Agency (EPA), and the Alaska Department of Environmental Conservation (ADEC). Special thanks to Gina Grepo-Grove, QA Chemist with the USEPA Region 10, for her thorough review, guidance, and assistance in the development of this template. Thanks to Kent Patrick-Riley, Non-point Source Quality Assurance Officer with ADEC, for his thorough and timely review and input.

Many thanks to all the Native Alaskans from villages across Alaska and the volunteers from the Cook Inlet Citizens' Environmental Monitoring Program who have attended the various trainings that helped make this document possible.

A1. Approval Page

Name: _____
Title: Tribal Council Elder
Project: _____
Organization: _____

Signature: _____ Date: _____

Name: (Tribe's Project Manager)
Title: Project Manager
Project: _____
Organization: _____

Signature: _____ Date: _____

Name: (Tribe's Quality Assurance Officer)
Title: QA Officer
Project: _____
Organization: _____

Signature: _____ Date: _____

Name:
Title: Tribal Field Operations /Project Assistant
Project: _____
Organization: _____

Signature: _____ Date: _____

Name: _____
Title: IGAP Coordinator
Project: Alaska Tribal IGAP Program
Organization: USEPA

Signature: _____ Date: _____

Name: Shawna Trumblee-Moser
Title: Project Assistant
Project: Tribal Water Quality Training Program

Organization: Native American Fish and Wildlife Society

Signature: _____ Date: _____
Name: Karen E. Stickman
Title: Project Coordinator
Project: Tribal Water Quality Training Program
Organization: Native American Fish and Wildlife Society

Signature: _____ Date: _____

Name: _____
Title: QA Manager
Project: Tribal Water Quality Training Program
Organization: Native American Fish and Wildlife Society

Signature: _____ Date: _____

Name: _____
Title: Quality Assurance Officer
Organization: Alaska Department of Environmental Conservation (ADEC)
Division of Air and Water Quality

Signature: _____ Date: _____

Name: Roy Araki
Title: Quality Assurance Manager
Organization: U.S. EPA, Region 10 206-553-6395

Signature: _____ Date: _____

A2. Table of Contents

A3. Distribution List

Official copies of this QAPP, accompanying documents and any subsequent revisions will be provided to:

Tribal Community

Name: _____
Title: Quality Assurance Manager, Tribe

Name: _____
Title: Project Manager, Tribe

Native American Fish and Wildlife Society

Name: Karen E. Stickman
Title: Project Coordinator
Project: Tribal Water Quality Training Program
Organization: Native American Fish and Wildlife Society Phone: 907-222-6005

U.S. Environmental Protection Agency

Name: Roy Araki
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Organization: U.S. EPA, Region 10 Phone: 206-553-6395

Name: Greg Kellogg
Title: Deputy Director
Organization: USEPA Region 10 - Alaska Operations Office Phone: 907-271-6328
Alaska Department of Environmental Conservation

Name: Kent Patrick-Riley
Title: Non-point Source Quality Assurance Officer
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Alaska Department of Environmental Conservation Phone: 907-269-7544

University of Alaska, Anchorage

Name: Dan Rinella
Title: Quality Assurance Officer
Project: Alaska Biological Monitoring and Assessment Program
Organization: University of Alaska Anchorage
Environment and Natural Resources Institute Phone: 907-257-2734

Name: Dan Bogan
Title: Quality Assurance Officer
Project: Alaska Biological Monitoring and Assessment Program
Organization: University of Alaska Anchorage
Environment and Natural Resources Institute Phone: 907-257-2744

Name: Ray RaLonde
Title: Technical Advisor
Project: Marine Advisory Program
Organization: University of Alaska Fairbanks Phone: 907-274-9691 ext. 3

Name: Joel Cooper
Title: Quality Assurance Officer
Project: Cook Inlet Citizen's Environmental Monitoring Program
Organization: Cook Inlet Keeper Phone: 907-235-4068 ext. 29

A4. Project/Task Organization

List the key project personnel and their corresponding responsibilities. See Appendix B for project personnel training records. (*You can insert an organizational chart if it is helpful to you)*

Name	Project Title
	Local Community Elder(s)
	Technical Advisory Committee
	Project Manager
	Project Quality Assurance Officer
	Field/Sampling Leader
	Laboratory Manager/Leader (may be sub-contract – optional)

Responsibilities

Local Community Elder(s) Responsibilities
List the names and titles of local tribal elders that will be involved in making decisions regarding this project. The main responsibility of the local community elder shall include providing historical and cultural information about the water resources that is being monitored based on their observations and experiences with the water resources and surrounding natural environment. Elders will assist the tribe in making decisions that will affect the tribe's cultural heritage.

Technical Advisory Committee (TAC) Responsibilities

List the names of personnel that will comprise the TAC and their respective training and qualification to adequately perform TAC's responsibilities. The TAC's main responsibility includes reviewing the monitoring plan and associated standard operating procedures as well as the results obtained from the monitoring effort on an annual basis. The committee may, at any time ask for additional information on any aspect of the project. If monitoring data raises a particular concern, the TAC will be asked to suggest and review any changes to the monitoring plan.

Project Manager (PM) Responsibilities

List the name of the Project Manager, educational background and other training that makes them a qualified Project Manager for the tribe. The Project Manager is the primary contact point for technical objectives, sampling, analytical procedures, QA requirements, problem resolution and general implementation of the QAPP. The Project Manager oversees the water quality monitoring efforts and other project activities, provides and ensures that each of the project team members conducting water quality monitoring has completed all of the required monitoring elements training and refresher courses provided by the Native American Fish and Wildlife Society (NAFWS) for the Tribal Water Quality Training Program (TWQTP).

Project Quality Assurance Officer (QAO) Responsibilities

Name the Tribe's QA Officer, qualifications and training (this can be put in an appendix if necessary). The QA Officer prepares the project QAPP and its subsequent revisions. The QA Officer ensures that the QAPP incorporates adequate QA and QC measures to meet the data quality objectives set forth by the project and the program and that the QAPPs are timely reviewed and approved by appropriate approving personnel. The QA Officer also ensures that the QA/QC measures specified in the QAPP are effectively implemented throughout the duration of the project. The QA officer coordinates and facilitates technical, performance and quality system audits conducted by appropriate authorities at the project-specified frequency.

Field/Sampling Leader (FSL) Responsibilities

Field or sampling leader(s) is/are responsible for the timely completion of assigned fieldwork with strict adherence to the QAPP's activity/task schedules, SOPs and sample chain-of-custody documentation.

Laboratory Manager/Leader Responsibilities

Specify the name of the laboratory that will perform the analyses for this project. Specify the name, phone number and/or e-mail address of the contact for the laboratory. The Laboratory Project Manager is responsible for the timely completion of the required fixed- laboratory analyses with strict adherence to the project-specified SOPs and program requirements.

Technical Support:

Specify who is under contract and who is providing support without compensation.
If the following personnel are part of the project grant, receiving honoraria by providing technical support for the Tribes, then, their names and description of responsibilities shall be included with the project's organization. If no compensation is involved then, the personnel listed below shall be listed under the Technical Support heading.

Quality Assurance Officer for Water Chemistry (QAOC)

Provides technical support and additional quality assurance for water chemistry.

Quality Assurance Officer for Biological (QAOB) Assessment

Provides technical support and additional quality assurance for Biological Assessment.

A5. Background/Problem Identification

(See QAPP Guide)

A6. Project/Task Description

General Overview of Project

(See QAPP Guide)

Objectives

The objectives of the (Name of Project) water quality monitoring effort are to:
See Guide for objective examples.

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The annual schedule of tasks and the personnel conducting the tasks for this project is listed in Table T-1. The parameters measured, methods used, applicability, laboratories used when applicable, method reference in this project is listed in Appendix C.

All personnel will follow the required Standard Operating Procedures (SOPs) for training, sample collection, sample analysis, data collection, quality assurance and quality control, data management, equipment and kit management, and waste management. The (Name of Project) is an on-going project designed to continue as long as funding allows.

Table T-1: ANNUAL SCHEDULE OF TASKS

TASK CATEGORIES	PERSONNEL RESPONSIBLE	J	F	M	A	M	J	J	A	S	O	N	D
TRAINING/QAPP PREPARATION/REVIEW/APPROVAL PROCESSES													
Training (Phase I, II & III)	NAWFS												
Performance Evaluations & Recertification for (list parameters)	NAWFS/PM/QAOC												
Biological Monitoring Training & Re-certification	NAWFS/PM/QAOB												
Preparation of the QAPP	PM/QAO												
Review and Approval of the QAPP (see Approval Page)	PM/ QAOC/QAOB/ NAWFS/ADEC/EPA												
MONITORING ACTIVITIES (year start – completed)													
Testing for general physical and chemical parameters (water chemistry monitoring)	Tribal Personnel												
Biological Monitoring	Tribal Personnel												
Data Entry	PM/QAO Tribe												
Split or Confirmatory for Chemical Sample Analysis Using Commercial lab*	PM/QAO Tribe												
QC for bioassessment sample collection and processing (10% of samples)	PM/QAO Tribe												
QC for bioassessment identifications (5% of samples)	PM/QAO Tribe												
Quarterly Data Verification and Validation	Tribe's QAO and/or QAOB, QAOC												
Internal Technical System Review (annually)	PM/QAO												
Annual External Technical System Review	EPA/State/contractors												
Annual QAPP review/revision	PM/QAOs												
Annual Project Report	PM/QAOs												
Management System Review if EPA- approved QMP exist (every 3 years)	EPA Region 10 QAM and QA staff												

*** Number of split samples depends on the frequency of sample collection. Recommendation: one per 20 total samples collected or once per year whichever is more frequent.**

A7. Data Quality Objectives and Criteria for Measurement of Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms used by EPA to describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, comparability, and measurement range. The overall QA objective for analytical data is to ensure that data of known, acceptable and legally defensible quality are generated. To achieve this goal, data must be reviewed for 1) precision, 2) accuracy or bias, 3) representativeness, 4) comparability, and 5) completeness.

The summary of DQO requirements for this project listing the suite of parameter for analysis, analytical methods, frequency of collection and analysis of QA/QC samples, precision, accuracy, and completeness requirements, sample container and preservative requirements and holding times are shown in Appendix E – Data Quality Objectives Table attached at the end of this QAPP. (See Guide for creating Appendix C, Methods Reference Table and Appendix D, Data Quality Objectives Table. Be sure to double check your final QAPP to make sure your appendices and tables are numbered, named and referenced correctly.)

Precision and Accuracy

Precision is the degree of agreement among repeated measurements of the same characteristic, or parameter, and gives information about the consistency of methods. Accuracy is a measure of confidence that describes how close a measurement is to its “true” value. Replicate measurements will be performed during each testing event, monitoring and training sessions and during annual performance evaluation and re-certification. Replicate analysis acceptability criteria and applicability for each environmental measurement are described in the method's SOP.

Field analytical precision will be evaluated by the relative percent differences (RPD) between field duplicate samples and/or replicate readings using the following formula:

$$RPD = \frac{(R1 - R2)}{((R1 + R2)/2)} \times 100$$

Where: R1 = the larger of the two replicate values
R2 = the smaller of the two replicate values

Field accuracy will be routinely checked according to the instrument and analytical method accuracy requirements (see Table 3 - Summary of Data Quality Objectives) of each parameter.

Commercial laboratory Accuracy and Precision: QC samples for accuracy and precision in a laboratory setting may include the analysis of the following: duplicate samples, laboratory control check and laboratory control check duplicate samples (LCS/LCSD) and/or matrix spike and matrix spike duplicate (MS/MSD) sample analyses and addition of surrogate spike. LCS and LCSD analyses are blank samples (from the lab) injected (spiked) with a known concentration of target compounds processed on the same date as the routine samples and analyzed with the routine samples. LCS/LCSD are usually performed in cases where insufficient amount of routine samples are available for the MS/MSD QC analyses. MS/MSD analyses are

routine samples injected with a known concentration of target compounds processed on the same date and same way and analyzed with the routine samples. Surrogate spike is a compound that is not one of the target compounds but belongs to same chemical category and has the same characteristics as the target compounds. Accuracy are determined by calculating the recoveries (%R) of the target compounds spiked into the LCS/LCSD and/or MS/MSD samples or the surrogate spiked into the sample using the following formula:

$$\% R = \frac{SQ - NS \times 100}{spike}$$

where:

%R = percent recovery
SQ = the concentration of the spiked compound measured in the routine or blank sample
NS = concentration of the target compound native to the unspiked routine or blank sample
Spike = the concentration of the target compound spiked in the routine or blank sample

Laboratory precision are calculated as follows:

$$RPD = \frac{(R1 - R2)}{((R1 + R2)/2)} \times 100$$

where: RPD= Relative Percent Difference and
R1 and R2 are the initial and duplicate measurement values, respectively

in case of MS/MSD and/or LCSD/LCSD

R1 = % Recovery of the target compound in the initial analysis (from MS or LCS)
R2 = % Recovery of the target compound in duplicate analysis (from MSD or LCSD)

Note: All reference to laboratory relative percent difference; laboratory duplicate samples; laboratory accuracy and precision; the spike recoveries; and the RPDs of the MS/MSD samples will be defined by the laboratory you choose to do your analysis for your project. The EPA and ADEC Quality Assurance Officers can help you determine whether the laboratory is providing an adequate measure for precision.

Data Representativeness

Representativeness is the extent to which measurements actually represent the true environmental condition. It is the degree to which data from the project accurately represent a particular characteristic of the watershed that is being tested. Representativeness of samples is ensured by adherence to standard field sampling and measurement and laboratory protocols. The design of the sampling scheme and number of samples for this project provide representativeness of the part of the watershed being monitored. As a whole, representativeness of the samples

collected for this project will be determined during data assessment and data interpretation phase.

Data Comparability

Comparability is the degree to which data can be compared directly to similar studies. Using standardized sampling, analytical methods and units of reporting with comparable sensitivity helps ensure comparability. The (fill in name of project) program has selected testing methods that are EPA-approved and/or currently being employed by other water quality monitoring programs throughout the country. As the program expands, site selection will favor locations where previous water quality monitoring has taken place. Efforts will be made to duplicate the effort of past studies where possible.

Data Completeness

Completeness is the comparison between the amounts of usable data collected versus the amount of data called for in the sampling plan. Completeness is the percentage of valid results obtained compared to the total number of samples taken for a parameter. The target completeness goal for this project shall be 75% or better. %Completeness is calculated using the following formula:

$$\% \text{ Completeness (per parameter)} = \frac{\text{\# of valid results}}{\text{\# of samples taken}} \times 100$$

The Data Quality Objectives listed in Appendix E will be used as the criteria for evaluating and determining the quality, bias and usability of the data generated for the project conducted. This will be performed during the data validation process.

A8. Training Requirements and Certification

To be able to participate in the (name of project) water quality monitoring program, participants are required to complete the three phases of specialized training provided by TWQTP and maintain proficiency through annual performance evaluation and re-certification training (See NAFWS Training SOP). The NAFWS TWQTP will provide training to individual Tribes wishing to participate in the program. Upon completion of the 3 phases of training, the participant receives a certificate of training completion. Annual 16-hour performance evaluations, workshops and re-certifications will be conducted by NAFWS according to the NAFWS Training SOP. Personnel performance is evaluated during training and annual performance evaluation and re-certification sessions. Trainers make note of each participant's precision and accuracy for all testing methods and comment on overall understanding of monitoring procedures and the watershed concept.

A9. Documentation and Records

All data gathered during this project is recorded on site at the time sampling occurs using a datasheet printed on write-in-the-rain paper. The minimum required data to be recorded for each method is identified in each method's SOP. Appendix E contains the datasheet for this project (see Guide for example datasheet). Personnel are instructed to fill out the datasheet legibly and completely and to the decimal point identified in each method's SOP. Data is entered using an indelible marker. If a mistake is made, one line is drawn through the characters in question and the new characters are entered to the immediate right of the lined-out entries. The date and

monitor's initials are entered immediately after the new characters.

Personnel are also instructed to use the comment section of the data sheet to report any problems or abnormalities with sampling procedures or equipment. All records and documents are kept at the (fill in blank) office and are available to NAWFS, ADEC and EPA for inspection at any time.

Monitoring equipment and supplies are inspected by the Tribe and NAFWS upon receipt and again during QC sessions. Equipment inspection form and corresponding SOPs for each method SOP are kept up-to-date for each equipment or measurement kit.

B. MEASUREMENT AND DATA ACQUISITION

B1. Sampling Process Design

Sample Site Selection

State in the QAPP the name of the water resources that will be monitored by the Tribal Community and state the geographical boundaries covered by the monitoring activities. Each proposed site will be given a name and identified by a site number and a location description, as well as by its latitude, longitude and elevation as determined by using either a GIS mapping program, using USGS topographical maps or a GPS. Site selection for future monitoring within (fill in blank) will be based on similar factors. See Appendix G for sample station table (see Guide for example of a blank table).

State in the QAPP the cultural and traditional importance of the water body to the Tribe and the local community. If the following criteria are applicable, discuss them in the QAPP.

- Traditional/local Knowledge: Traditional and local knowledge will be collected from the Elders and local Community members. This will include observations and experiences with the water body proposed and will be used for water quality monitoring and its surrounding natural environment. State in the QAPP how this information will be useful and used for the project.

- Private property access: If a site requires entering or crossing private property the landowner should be considered in the site selection process. (fill in) will be responsible for obtaining permission in writing prior to using the site for sampling.

- Historical Data: If historical data exists for the chosen waterbody, list the previous studies conducted on the site, the parameters/target analytes that were determined and the summary of results, if available.

- Representativeness: Will be met by selecting sites that represent the true natural environmental condition. State in the QAPP how water quality monitoring will represent and impact the true natural environmental condition.

- Logistical Access & Safety: Consideration will be given to select sites that are safe and reasonably accessible. Discuss the safety and reasonable access considerations and/or criteria used when choosing the proposed monitoring site.

Sampling Parameters

As described in Section A6, testing parameters are selected based on their usefulness in inventorying water quality and projecting the general "health" of the water bodies in question. Due to cost concerns, only the more affordable sampling and analytical parameters have been selected to ensure the viability of long term monitoring. (See QAPP Template guide to select your parameters) A list of sampling and analytical parameters for this project can be found in Appendix C and D of this document.

Sampling Frequency

The impact of rain events on water quality is a factor to be considered in the (fill in project name) program. Personnel will strive to maintain a regular monitoring schedule regardless of precipitation and to document past and present weather conditions at the time of sampling. Given the climate of Alaska it is likely that some sites may not be reasonably accessible on the appointed sampling date. Personnel will make efforts to reschedule sampling events as weather allows. Sampling frequency for all parameters measured in this project and the estimated schedule of activities are shown in Tables T-1 and T-2.

Table T-2: Sampling Frequency

Parameter	Months	Days	Time	Interval

Site Safety Plans

The following safety precautions discussed below do not constitute a safety plan, and approval of this QAPP doesn't constitute a safety plan approval.

Sampling sites are selected, in part, because they are safely accessible. Personnel are instructed to use safe access routes and will be warned of site-specific hazards. Whenever possible, samples are collected by a field sampling team. In winter months, personnel are advised to exercise caution at sampling sites with no direct road or winter trail access and not to sample when weather conditions are extreme. Personnel may, at times, be required to chop and maintain holes in ice covered fresh water sites, but they are allowed not to monitor if ice may be too thin to support them safely.

Personnel will use appropriate safety equipment during sampling and analysis. This will include: goggles or protective eye wear, rubber gloves, and dust masks when necessary. Personnel who must sample their sites by wading in from shore will wear rubber boots and dress appropriately and be prepared for variable weather conditions.

B2. Sampling Method Requirements

_____ (specify type- e.g. stream, lake, estuary, etc.) samples will be collected at _____ (specify depth- e.g. surface, mid depth, etc.) and at the following location_____ (specify location- e.g. next to shore, mid stream, etc.). Sampling methods for this project will be

conducted as outlined in each method's Standard Operating Procedure (SOP) which identifies the parameter(s) it measures, sampling equipment, container, method of preservation, and maximum holding time before prior analysis and summarized in Appendix D - Data Quality Objectives.

B3. Sample Handling and Custody Procedures

The project's field personnel will conduct all of the field parameter testing for this project. Split samples or samples identified for additional fixed-laboratory analyses will be sent to laboratory. Labs will be selected based on the consideration of the following factors: 1) If ADEC or EPA certifies the lab to perform the analysis needed; and/or 2) The lab participates in a standard certification program.

Samples that require laboratory testing will be handled following this chain of custody procedure:

- Samples will be labeled (see Figure F-1) and logged in a monitor datasheet upon collection. When working with commercial laboratories, sample bottles and labels may be provided.
- Once samples have been collected they are returned to the _____ and logged in for temporary storage.
- Samples will be the responsibility of the field crew and stay with the project personnel or designated representative at all times until shipment to the lab.
- Samples are stored, preserved and analyzed as outlined by the method's SOP.
- Project personnel are responsible for coordinating sample transport to a laboratory for analysis. Labs will be selected based on the consideration of the following factors: 1) If ADEC or EPA certifies the lab to perform the analysis needed; and/or 2) The lab participates in a standard certification program.
- Laboratory personnel will record the date and time the sample arrives at the lab.
- All results from the laboratory are reported in the annual report.
- The Sample Custody Form (see Appendix G) (See QAPP Guide Appendix G for example) or one provided by the laboratory will be used to record all transport and storage information.

Figure F-1: SAMPLE CONTAINER LABEL

Village name
907-xxx-xxxx
Field Information:
Type of Sample: _____
Site #: _____ Location: _____ Sample Number ___ of ___
Preservation Method: _____ Gear: _____ Date: ___/___/___
Time: _____ AM PM
Name: _____ Phone: _____

Signature: _____

Lab Information:
Date: ___/___/___ Time: _____ AM PM Phone: _____

Analyst: _____ Signature: _____

B4. Analytical Methods Requirements

The analytical method requirements for all methods used in this project are outlined in Appendix C and D of this document and each method's SOP. When working with a laboratory, the maximum laboratory turnaround time from sample receipt to providing analytical results shall be _____ days (agree upon this turnaround time with the laboratory you are working with).

B5. Quality Control Requirements

The following quality assurance and quality control measures are taken to assure the quality of the data collected:

- All of the personnel directly involved with the water quality monitoring program and this project are required to complete Phase I through III of training to be eligible to collect data.

- All of the personnel directly involved with this project are required to attend annual re-certification training and workshop offered by the NAFWS to review monitoring procedures and maintain proficiency skills in sample collection and data generation. Re-certification training and workshop shall include the analysis of blind performance evaluation (PE) samples per water quality parameter re-certified as an overall check of performance and proficiency.

- Replicate measurements shall be performed in the field. Precision of the replicate analyses shall be within the acceptable criteria set forth by the instrument or the method SOP. Only replicate measurements that meet the precision criteria will be entered in the project database. Should a problem arise due to unacceptable precision results, no other measurements for the parameter will be conducted until the cause of the problem is identified and resolved.

- Calculation of precision, accuracy, and completeness will be performed as outlined in Section A-7.

- Depending on the frequency of the sample collection and measurement activities, split samples may be collected and analyzed by a laboratory. Split confirmatory samples may also be sent to the commercial laboratory in case questionable/anomalous high results were obtained in the field. Labs will be selected based on the consideration of the following factors: 1) If ADEC or EPA certifies the lab to perform the analysis needed; and/or 2) The lab participates in a standard certification program.

- At a minimum, the commercial laboratory performing the split or confirmatory analyses shall have the following QC analyses included in their data package deliverables: Results for method blank, sample and QC sample surrogate recoveries and a laboratory control/duplicate sample and or matrix spike/duplicate samples analyses.
- Three levels of data verification will be employed, i.e., during sample collection, data documentation and data entry and generation processes. Data that did not meet the DQO

of the project are appropriately flagged or qualified in the database during the data validation process.

- QC2 samples shall be collected and submitted to the QA Officers for Biological and/or Habitat Testing at the beginning of the project for sample collection and processing, field taxa identification verification and monitor's proficiency evaluation. Thereafter, QC2 samples shall be collected and submitted for sample collection and processing at a frequency of 10% of total samples collected.

- A QC3 sample shall be collected and submitted to the QA Officers for Biological and/or Habitat Testing for Macroinvertebrate Taxonomic Verification at a frequency of 5% of total sites sampled.

- All calculations are performed automatically after entering the data in the database, thus, removing or minimizing the occurrence of errors.

- In consultation with the TAC, State, EPA and other technical specialists, data shall be evaluated for consistency and reliability and may necessitate re-sampling and sample analysis via commercial laboratory.

- Internal and external QA assessments shall be performed to assess the progress and effectiveness of the project annually.

- The (name of project) program periodically receives comments and technical advice from the Technical Advisory Committee (Appendix A).

- Additional QC activities may be conducted as dictated by the analytical methods of SOPs used in the collection of environmental measurements.

B6. Instrument/Equipment Testing, Inspection, and Maintenance Requirements

The NAFWS Kit Management and the environmental measurement SOPs describe the proper handling and maintenance of equipment. Proper equipment handling and maintenance is also emphasized during all training and QC sessions.

Initial inspection, testing and assurance that all of the sample collection and measurement kits meet the technical specifications as specified by the method and/or SOP are the responsibilities of NAWFS and are performed upon receipt of the equipment/instrumentation and prior to distribution for use by the tribes. NAWFS shall also ensure that all of the reagent bottles deployed with the kits are dated with the expiration dates prior to being issued and that a Water Quality Test Kit Inspection Form (see NAFWS Kit Management SOP) is filled out appropriately and kept both on the (project fill in blank) file and the NAWSF office. NAWFS shall evaluate the instruments/equipment annually during the re-certification phase of the program. Temperature calibration with a NIST thermometer shall also be performed by NAWFS during re-certifications.

The following are the responsibilities of the Tribes with regards to instrument/equipment maintenance:

(1) Before each sampling event, the monitoring personnel shall inspect and test all equipment and reagents and ensure that they are clean and in good working condition.
(2) If any equipment or chemical reagent is found to be defective in any way, the tribe shall contact the manufacturer and arrange for immediate replacement or repair.
(3) Whenever, a faulty piece of equipment or reagent is replaced, the tribe shall create a new Water Quality Test Kit Inspection Form and keep the form in their office file.
(4) The project personnel shall maintain an adequate supply of expendable needs of the project (e.g., reagents, parts, tools, etc) located at the (fill in blank) office. The quantity of reagent maintained in the office shall be carefully estimated to assure that replenishments are received before exhaustion of the supply and that stored supplies do not exceed expiration dates.
(5) Reagent stocks are to be rotated out upon expiration.

B7. Instrument Calibration and Frequency

All of the field instruments and equipment shall be calibrated before use following the calibration procedures described in each method SOP. Calibration log forms are provided in the NAFWS Kit Management SOP.

All commercial laboratory instrumentation and equipment used in the analysis for this project shall be calibrated prior to sample analysis in accordance with the technical specifications and procedures specified in the analytical method used.

B8. Inspection and Acceptance Requirements for Supplies

Monitoring equipment and supplies are ordered from various manufacturers (see each method's SOP for manufacturers' name and contact information) and are inspected upon arrival by project personnel. A Water Quality Test Kit Inspection Form provided in the NAFWS Kit Management SOP, which includes reagent expiration dates is completed for each kit and kept on file at the (fill in blank) office. Broken bottles, incomplete kits and reagents or instruments that do not meet standards are shipped back to the manufacturer for replacement.

B9. Data Acquisition Requirements

Required longitude and latitude information for monitoring sites is derived by using USGS topographic maps at 1:63,360 and confirmed using GPS coordinates taken at the site by the project personnel. Sites may be plotted and spatially checked using a Geographic Information System (GIS) computer-mapping program (eg, ArcView). This information is used to identify monitoring sites and assign site numbers for entry into the monitoring data system.

Historical water quality data on the sites will be collected and summarized. This data will be used in the site selection process. Additional water quality, fish and wildlife habitat, physical river characteristics and other data pertaining to the watershed will be gathered and utilized in writing the annual report. Historical data will be analyzed to assess direct comparability and may be qualified or excluded from trend analyses in annual reports.

Water quality data will be evaluated by comparison to state and federal water quality standards as applicable.

B10. Data Management

Monitoring personnel shall collect and report data on the datasheet(s) (Appendix E) provided for this project. All observational data, water quality data and field measurements are recorded at the time of sampling and analysis. All personnel sign and date the datasheets. The data sheets are kept and maintained in an organized file in the (name of tribe) office.

Field datasheets and other sample documentation shall be initially reviewed by the monitor or sample collector and peer reviewed by another personnel prior to data entry to the project database for transcription errors, precision, completeness, anomalous data, and other general problems. The project personnel shall ensure that data generated are accurately entered into the Microsoft 2000 Access or Excel database. A more detailed description of the data management process that will be followed for this project is discussed in the CEMP Data Management SOP. The database is still under development and testing stages and when completed shall be compatible with EPA's STORET database. Data will be exported through the Internet to the EPA STORET database to the extent allowed by the governing body. Once in the STORET database the data will be available to the extent allowed by the governing body spatially through the Internet at the Alaska's Cooperatively Implemented Information Management System (CIIMMS) website.

Data are reviewed regularly by the project personnel, and will be presented each (fill in blank) in an annual report (see Section C2).

C. Assessment and Oversight

C1. Assessment and Response Actions

Project Level Assessments (Internal assessments of project)

- All project personnel shall undergo a re-certification training and workshop which includes the analysis of blind performance evaluation (PE) samples per water quality parameter re-certified as an overall check of performance and proficiency of the monitor or sample collector.

- Depending on the frequency of the sample collection and measurement activities, split samples shall be collected and analyzed by a laboratory. Split confirmatory samples shall also be sent to the laboratory in case questionable/anomalous high results were obtained in the field. Labs will be selected based on the consideration of the following factors: 1) If ADEC or EPA certifies the lab to perform the analysis needed; and/or 2) The lab participates in a standard certification program.

- Three levels of data verification shall be employed, i.e., during sample collection, data documentation and data entry and generation processes. Data that did not meet the DQO of the project are appropriately flagged or qualified in the database during the data validation process.

- The Technical Advisory Committee will review this QAPP and the overall project design annually and may suggest procedural refinements or additional testing procedures. This may include new parameters to be measured or changes to procedures currently in use.

Any such changes will be subject to EPA and ADEC approval. The project is open to EPA or ADEC system audits at their discretion.

- An internal QA assessment and technical system review (TSR) shall be conducted by the project, chemical, habitat and biological QA officers for the project to assess the progress and effectiveness of the project annually.

Program Level Assessments (External assessments of program)

- A TSR of the project shall be conducted by EPA, State or contactor to assess the progress and effectiveness of the project annually, or as requested by the program.

- In addition to the PE samples analyzed during re-certification, depending on funding and availability, additional performance evaluation sample may be submitted blind to the project personnel for analysis at least once per year.

Response and Corrective Actions

Problems encountered during sample collection and data generation shall be handled accordingly and as soon as possible. No measurements will be generated by an instrument or piece of equipment that did not meet the technical specifications of the manufacturer or the method SOP. Problems that may have a big impact on data quality shall be properly documented and resulting data will be flagged accordingly.

Any failure to meet data quality objectives will be evaluated. If the cause is found to be equipment failure, calibration and maintenance procedures will be reassessed and improved. If the problem is found to be personnel error, personnel will work with the Project QA Officer to resolve the problem. If accuracy and precision goals are frequently not being met, QC sessions will be scheduled more often.

If failure to meet program specifications is found to be unrelated to equipment, methods, or personnel error, the QAPP may be revised. Revisions and subsequent modifications and amendments to this QAPP shall be submitted to the designated state ADEC and federal EPA, Region 10 Quality Assurance Manager for review and approval.

C2. Reports

Annual reports will be produced in (fill in blank) of each year and will describe activities during the previous calendar year. These reports will consist of data results, interpretation of data, information on project status, highlights, results of QC audits and internal assessments.

The project personnel are responsible for report production and distribution. Annual reports will be forwarded to ADEC, the regional office of EPA and all other parties listed in Section A3 of this document as well as the Technical Advisory Committee. Summaries of all reports highlighting the assessment results, project status and achievements will be distributed to the (fill in blank) Tribal Council.

D. Data Validation and Usability

D1. Data Review, Validation, and Verification Requirements

All data collected by project personnel is subject to review by the Chemical and Habitat QA Officer; Biological QA Officer; Project QA Officer; Project Manager; Field/Sampling Leader; and the Laboratory Manager/Leader to determine if the data meet QAPP objectives. Decisions to reject or qualify data are made by the Project QA Officer.

D2. Validation and Verification Methods

Data Verification

Data sheets must be filled out completely and signed by all monitors present at the time of sampling and analysis. There will be at least three levels of data verification for this project, (1) field data sheet and data generation documentation review by the sample collector, (2) peer review by a personnel other than the sample collector and (3) data review and evaluation by the project QA Officer. During this process, datasheets for calibration and measurements and chain-of-custody records shall be checked and evaluated for precision, missing or illegible information, errors in transcription and calculation and values outside of the expected range.

When review is completed and any concern addressed, each datasheet is signed and dated by the Project QA Officer. If data quality questions cannot be adequately resolved, data will not be entered into the data system and the Project QA Officer will arrange for corrective measures (i.e. re-training, equipment re-calibration, etc.). Any changes made to data are initialed and dated, and any action taken as a result of the data review is specifically recorded on the datasheet below with the reviewers' signatures and dates of signatures.

Data Validation

Data validation shall be conducted on all environmental data generated for this project by the Chemistry, Habitat and Biological Monitoring Quality Assurance Officers in accordance with the specifications and QC acceptance criteria set forth by the analytical methods and SOPs used for each environmental measurement. Data that did not meet the DQO of the project are appropriately flagged or qualified in the database during the data validation process.

On a quarterly basis, the Project QA officers print the data and proof read it against the original data sheets. Errors in data entry are corrected and inconsistencies are flagged for further review. Data shall be presented annually using graph and report formats to document baseline water quality, identify trends and detect deficiencies in data collection or program design.

Annual reports will include discussion of any data quality problems and will be distributed to all data users (see Section C). Members of the Technical Advisory Committee will be asked to review these reports and offer suggestions for improving the (fill in blank) Project.

D3. Reconciliation with Data Quality Objectives

Data generated by this project shall be evaluated and assessed in accordance with the DQO requirements listed in Table 3 and the technical specifications and QC acceptance criteria set

forth by the analytical methods and SOPs used for each environmental measurement. All of the data generated shall be reported in the database. Data that were slightly outside the DQO goals of the project shall be appropriately flagged or qualified in the database with a short narrative defining the qualifier and its effect to the quality of the data.

Annual reports shall be prepared and will be distributed to the list provided in section C of this QAPP.